



**Aerospace
Systems Division**

PROTOTYPE CENTRAL STATION
MODEL " G "

NO.	REV. NO.
ATM-666	
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DATE 1 June 1967	

Bob Miley

The purpose of this ATM is to outline:

- (i) the tests to which the Prototype "G" model of the Central Station has been subjected
- (ii) the problems which have occurred
- (iii) the various stages of mechanical assembly of the thermal plate.

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R. W. Shay

RETURN TO MILEY

SHARPE MS
JAMES OK OTHER COPY
McDONALD OK OTHER COPY

Bob —

See if you can follow up on this MX problem a little more pls.
Bob



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1.0 TESTS COMPLETED

Since its initial integration, the Central Station "Proto Model G" has satisfactorily completed the requirements of the integration Test Procedure No. 2333033 on two occasions. It is currently dismantled while the 'new' thermal plate is with manufacturing for rework, prior to the assembly of the Central Station C/W thermal bag and primary structure, in readiness for thermal-vacuum testing.

All Array 'A' experiments have been integrated with the Central Station. Each was integrated individually at first, followed by complete integration of all available experiments simultaneously, during this test crosstalk measurements were made. The initial crosstalk check had to be conducted without the S. I. D. E. as it was, at the time, unavailable. The rerun of the experiment integration with up-dated procedures was satisfactorily completed using all experiments, namely:

Experiment No. 1	Passive Seismic
Experiment No. 2	Magnetometer
Experiment No. 3	Solar Wind
Experiment No. 4	Suprathermal Ion Detector plus Cold Cathode Gauge

Other tests completed with the Central Station are full scale EMI/RFI check on the Central Station and the System Test Set, but due to the unavailability of the second screen room the support equipment had to be housed in the System Test Lab using 50 feet shielded cables.

The power profile was checked using, as a basic criterion, the level of power demand at which the Experiment No. 4 was rippled-off by the P. D. U. The check was repeated using various combinations of components within the Central Station

The checks conducted on the Central Station were dictated by formal test procedures which were up dated and/or completed as necessary.

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*CHRIS
ANDREWS
7/160*

FIELD EFFECT TRANSOR

*PEP'S
SPECIAL -
DYN. COATINGS
PROBLEM -*

2.0 POINTS ARISING FROM THE TESTS

The major failure problem with the Central Station to date has been the A/D Converter and Multiplexer. Failure has occurred on three units — resulting in rework by the Vendor before the unit was again operational.

The failure was apparent by the printout from the S. T. S. reading 000 or 377 octal. These failures were reported in Discrepancy Reports: DR 4315, DR 4090, DR 4094.

During the earlier stages of testing, trouble was experienced with the P. C. U. It having failed to switch from No. 1 to No. 2, also whenever Regulator No. 2 was loaded to its rated maximum, the PCU would lose regulation.

These problems were dealt with by the PE and since the PCU has given no trouble whatever.

Recently, on occasions, difficulty in transmitting commands from the system test set has been noted. A check on the receiver with the subsystem test set proved that it was still within its specification limits. The Command Decoder operated quite satisfactorily on the downlink test set, responding to each command with command verification in each case.

The RF cable, used to connect the Central Station to the System Test Set, was passed to the calibration lab who determined that the insertion loss of the cable was 6.3 dB. The RF path loss from the S-Band signal generator to the output of the System Test Set is measured at 31 dB. It has been the practice to set the attenuator on the S-Band signal generator to -62 dB.

Thus the total loss between the S-Band generator and the receiver input sums in the following manner:

Calibrated output from STS with dial setting of 62 dB	92 dBm
RF cable loss	6.3 dB
ALSEP antenna cable loss	0.5 dB
Diplexer filter loss	1.5 dB
	-100.3 dBm

Thus under these conditions the receiver was being operated at only 0.7 dB



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above its threshold of -101 dBm also the receiver noise suppression does not become operative until -97 dBm, furthermore, the results from the bit-error-rate tests, taken during integration, show that this receiver command decoder combination is 1 dB down on the figures taken during the S-Band compatibility trails at Houston, which gave a signal limit of -95 dBm for a Probability of error of 1 in 10^{-6} .

The probability of error at -100 dBm would be in the region of 10^{-2} , thus it is remarkable, and to the credit of the receiver, that it operated as well as it did.

With the initial turn on following an extended off period, erroneous commands are indicated on the System Test Set. This is only apparent after an off period and is caused by the short term unsteady state during the turn-on of the Central Station until all supplies around the Central Station have settled. The period is very short lived but is of sufficient duration to generate a spurious pulse, which to an SCR that will normally trigger from a pulse of nanoseconds duration, appears to be a discreet command and so triggering the SCR, supplying power to the indicator lamp.

The SCR trigger circuit in the STS is, by design, made more sensitive than the experiments circuitry so that any crosstalk between command lines would show immediately. This situation is one that will not be repeated with the experiments connected to the Central Station.

The Central Station components have been integrated with the Proto G thermal plate on two occasions satisfactorily, it is now in preparation for the thermal vacuum tests using the experiment simulator in the System Test Set.



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3.0 CONCLUSIONS

The successive failures of the multiplexer has not to any extent held up the program of testing and experiment integration. The STS printouts were studied but no failure pattern could be deduced from the data contained in the readout.

Since rework, by engineering, on the P. C. U. this unit has given no reason for concern, it successfully completed the power profile tests, giving valid and repeatable results. Both current regulators can now be loaded to the rated maximum and do not lose regulation.

Now that calibration charts are available for the System Test Set it is anticipated that no more trouble should be experienced with command transmission.

The Central Station has, to date, been operated with the System Test Set for a total time in excess of 100 hours and has given satisfactory results.